CLAIMS

1. A method of allocating power to remote station specific control channels, the method comprising:

A) sorting a plurality of access terminals in an order of increasing required medium access control (MAC) channel power into a plurality of bins;

B) if two or more access terminals have equal required MAC channel power, sorting the access terminals with equal required MAC channel power in an order of decreasing forward link signal to interference and noise ratio (FL_SINR);

C) determining total available ARQ power based upon total MAC channel power, total power allocated to reverse power control (RPC) channels, and total power allocated to reverse activity bit (RAB) channels;

D) comparing the total available ARQ power to total required ARQ power of the access terminals; and

E) if the total available ARQ power is less than the total required ARQ power of the access terminals in response to step D),

a) reducing power allocation to users in one of the bins with highest required ARQ power in a predetermined increment until a predetermined maximum reduction is reached;

b) reducing power allocation to users in each of remaining ones of the bins in a decreasing order of required ARQ power in the predetermined increment until a predetermined maximum reduction is achieved; and

c) if the total available ARQ power is less than the total required ARQ power, repeating steps a) and b) until the total available ARQ power is greater than or equal to the total required ARQ power.

2. The method of claim 1, wherein the step of determining total available ARQ power comprises subtracting the total power allocated to the RPC channels and the total power allocated to the RAB channels from the total MAC channel power.

3. The method of claim 1, further comprising:

F) if the total available ARQ power is greater than the total required ARQ power of the access terminals in response to step D),

a) boosting power allocation to remaining access terminals in the order of decreasing FL_SINR; and

b) boosting power allocation to ARQ channels of all active access terminals in predetermined increments until a predetermined maximum increase is reached.

4. The method of claim 1, wherein the step of determining total available ARQ power comprises:

allocating a first predetermined fraction of the total MAC channel power to the RAB channels in a cell; and

allocating not greater than a second predetermined fraction of the total MAC channel power to the RPC channels in the cell.

5. The method of claim 4, further comprising:

computing the total required ARQ power for all of the access terminals in the cell;

determining whether the access terminals include one or more non-handoff access terminals which failed to decode a packet after a last subpacket of the packet;

if the access terminals include one or more non-handoff access terminals which failed to decode the packet after the last subpacket, determining whether a forward link signal to interference and noise ratio (FL_SINR) of each of the non-handoff access terminals which failed to decode the packet after the last subpacket is greater than a predetermined threshold;

if the FL_SINR is greater than the predetermined threshold, allocating a first predetermined power level to an extended automatic repeat request (E-ARQ) channel of each of the non-handoff access terminals which failed to decode the packet after the last subpacket and which has FL_SINR greater than the predetermined threshold; and

allocating a second predetermined power level to the E-ARQ channel otherwise.

6. The method of claim 1, further comprising assigning remaining MAC channel power to ARQ channels of all of the access terminals which regard the cell as a serving cell.

7. The method of claim 6, wherein the step of assigning the remaining MAC channel power to the ARQ channels of all of the access terminals which regard the cell as the serving cell comprises:

ranking all of the access terminals in an order according to the FL_SINR of each of the access terminals;

setting a number M initially to 0;

assigning ARQ channel power to a given one of the access terminals which regard the cell as the serving cell according to the steps of:

a) if FL_SINR<-x-M, wherein x is a predetermined number, assigning a first predetermined ARQ channel power level to the given access terminal;

b) if –x-M<FL_SINR<x-M, assigning a second predetermined ARQ channel power level to the given access terminal; and

c) if FL_SINR>x-M, assigning a third predetermined ARQ channel power level to the given access terminal; and

if the remaining MAC channel power is depleted,

incrementing M by 1; and

repeating steps a)-c) until the remaining MAC channel power is assigned to the ARQ channels of all of the access terminals which regard the cell as the serving cell.

8. The method of claim 7, further comprising:

determining whether M is greater than 0 after all of the access terminals which regard the cell as the serving cell are assigned ARQ channel power;

if M is greater than 0,

setting an ARQMode flag; and

setting one or more new access terminals acquired by the cell in an on-off keying (OOK) mode.

9. The method of claim 8, further comprising:

determining whether M is equal to 0 for a predetermined number of consecutive slots;

if M is equal to 0 for a predetermined number of consecutive slots,

unsetting the ARQMode flag; and

setting one or more new access terminals acquired by the cell in a bipolar mode.

10. The method of claim 9, further comprising:

determining whether remaining MAC channel power is available after the ARQ channels of all of the access terminals which regard the cell as the serving cell are assigned MAC channel power and M is equals to 0; and

if the remaining MAC channel power is available after the ARQ channels of all of the access terminals which regard the cell as the serving cell are assigned MAC channel power and M is equals to 0,

assigning the remaining MAC channel power to ARQ channels of one or more soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded a packet before a last subpacket of the packet.

11. The method of claim 10, further comprising ranking the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket in an order according to the FL_SINR of each of the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket.

12. The method of claim 11, wherein a predetermined power level is assigned to the ARQ channels of the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket according to the ranking until

either the ARQ channels of all of the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket are assigned MAC channel power,

or the remaining MAC channel power is no longer available.

13. The method of claim 12, further comprising:

determining whether remaining MAC channel power is available after the ARQ channels of all of the soft-handoff access terminals which regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket are assigned MAC channel power; and

if the remaining MAC channel power is available after the ARQ channels of all of the access terminals which regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket are assigned MAC channel power, assigning the remaining MAC channel power to ARQ channels of one or more non-handoff access terminals.

14. A computer readable medium embodying a method of allocating power to remote station specific control channels, the method comprising:

A) sorting a plurality of access terminals in an order of increasing required medium access control (MAC) channel power into a plurality of bins;

B) if two or more access terminals have equal required MAC channel power, sorting the access terminals with equal required MAC channel power in an order of decreasing forward link signal to interference and noise ratio (FL_SINR);

C) determining total available ARQ power based upon total MAC channel power, total power allocated to reverse power control (RPC) channels, and total power allocated to reverse activity bit (RAB) channels;

D) comparing the total available ARQ power to total required ARQ power of the access terminals; and

E) if the total available ARQ power is less than the total required ARQ power of the access terminals in response to step D),

a) reducing power allocation to users in one of the bins with highest required ARQ power in a predetermined increment until a predetermined maximum reduction is reached;

b) reducing power allocation to users in each of remaining ones of the bins in a decreasing order of required ARQ power in the predetermined increment until a predetermined maximum reduction is achieved; and

c) if the total available ARQ power is less than the total required ARQ power, repeating steps a) and b) until the total available ARQ power is greater than or equal to the total required ARQ power.

15. The computer readable medium of claim 14, wherein the step of determining total available ARQ power comprises subtracting the total power allocated to the RPC channels and the total power allocated to the RAB channels from the total MAC channel power.

16. The computer readable medium of claim 14, wherein the method further comprises:

F) if the total available ARQ power is greater than the total required ARQ power of the access terminals in response to step D),

a) boosting power allocation to remaining access terminals in the order of decreasing FL_SINR; and

b) boosting power allocation to ARQ channels of all active access terminals in predetermined increments until a predetermined maximum increase is reached.

17. The computer readable medium of claim 14, wherein the step of determining total available ARQ power comprises:

allocating a first predetermined fraction of the total MAC channel power to the RAB channels in a cell; and

allocating not greater than a second predetermined fraction of the total MAC channel power to the RPC channels in the cell.

18. The computer readable medium of claim 17, wherein the method further comprises:

computing the total required ARQ power for all of the access terminals in the cell;

determining whether the access terminals include one or more non-handoff access terminals which failed to decode a packet after a last subpacket of the packet;

if the access terminals include one or more non-handoff access terminals which failed to decode the packet after the last subpacket, determining whether a forward link

signal to interference and noise ratio (FL_SINR) of each of the non-handoff access terminals which failed to decode the packet after the last subpacket is greater than a predetermined threshold;

if the FL_SINR is greater than the predetermined threshold, allocating a first predetermined power level to an extended automatic repeat request (E-ARQ) channel of each of the non-handoff access terminals which failed to decode the packet after the last subpacket and which has FL_SINR greater than the predetermined threshold; and

allocating a second predetermined power level to the E-ARQ channel otherwise.

19. The computer readable medium of claim 14, wherein the method further comprises assigning remaining MAC channel power to ARQ channels of all of the access terminals which regard the cell as a serving cell.

20. The computer readable medium of claim 19, wherein the step of assigning the remaining MAC channel power to the ARQ channels of all of the access terminals which regard the cell as the serving cell comprises:

ranking all of the access terminals in an order according to the FL_SINR of each of the access terminals;

setting a number M initially to 0;

assigning ARQ channel power to a given one of the access terminals which regard the cell as the serving cell according to the steps of:

a) if FL_SINR<-x-M, wherein x is a predetermined number, assigning a first predetermined ARQ channel power level to the given access terminal;

b) if –x-M<FL_SINR<x-M, assigning a second predetermined ARQ channel power level to the given access terminal; and

c) if FL_SINR>x-M, assigning a third predetermined ARQ channel power level to the given access terminal; and

if the remaining MAC channel power is depleted,

incrementing M by 1; and

repeating steps a)-c) until the remaining MAC channel power is assigned to the ARQ channels of all of the access terminals which regard the cell as the serving cell.

21. The computer readable medium of claim 20, wherein the method further comprises:

determining whether M is greater than 0 after all of the access terminals which regard the cell as the serving cell are assigned ARQ channel power;

if M is greater than 0,

setting an ARQMode flag; and

setting one or more new access terminals acquired by the cell in an on-off keying (OOK) mode.

22. The computer readable medium of claim 21, wherein the method further comprises:

determining whether M is equal to 0 for a predetermined number of consecutive slots;

if M is equal to 0 for a predetermined number of consecutive slots,

unsetting the ARQMode flag; and

setting one or more new access terminals acquired by the cell in a bipolar mode.

23. The computer readable medium of claim 22, wherein the method further comprises:

determining whether remaining MAC channel power is available after the ARQ channels of all of the access terminals which regard the cell as the serving cell are assigned MAC channel power and M is equals to 0; and

if the remaining MAC channel power is available after the ARQ channels of all of the access terminals which regard the cell as the serving cell are assigned MAC channel power and M is equals to 0,

assigning the remaining MAC channel power to ARQ channels of one or more soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded a packet before a last subpacket of the packet.

24. The computer readable medium of claim 23, wherein the method further comprises ranking the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket in an order according to the FL_SINR of each of the soft-handoff access terminals which

do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket.

25. The computer readable medium of claim 24, wherein a predetermined power level is assigned to the ARQ channels of the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket according to the ranking until

either the ARQ channels of all of the soft-handoff access terminals which do not regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket are assigned MAC channel power,

or the remaining MAC channel power is no longer available.

26. The computer readable medium of claim 25, wherein the method further comprises:

determining whether remaining MAC channel power is available after the ARQ channels of all of the soft-handoff access terminals which regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket are assigned MAC channel power; and

if the remaining MAC channel power is available after the ARQ channels of all of the access terminals which regard the cell as the serving cell and which have successfully decoded the packet before the last subpacket are assigned MAC channel power, assigning the remaining MAC channel power to ARQ channels of one or more non-handoff access terminals.